MAYILADUMPARAI

Beginning of Agrarian Society
4200 years old Iron Age culture in Tamilnadu

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF ARCHAEOLOGY

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MAYILADUMPARAI

Beginning of Agrarian Society / 4200 years old Iron Age culture in Tamilnadu

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FOREWORD

The history and culture of Tamil Nadu are taking a new turn with the discovery of innumerable inscriptions, copper plates and archaeological sites in recent years. The series of explorations and excavations conducted at various places ranging from the palaeolithic period down to the historical times provided encouraging results. The scientific analysis of the artefacts unearthed in the excavations proves the rich cultural heritage of the Tamils.

The Keeladi, Kodumanal and Porunthal excavations placed the beginning of the Damili (Tamil-Brahmi)script in the 6th century BCE on scientific line. Further, the amount of Damili inscriptions both on stone and pottery reflects that the literacy rate of the Tamils is so high as early as two thousand six hundred years ago. Besides, the excavations at Korkai, Alagankulam, Karur, Modur, Mangadu, Terriruveli, Arikamedu and Poompuhar placed the evidences on firm foot that the ancient Tamizhakam experienced the urbanization and industrialization as early as 6th century BCE. The discovery of Punch Marked coins, Northern Black Polished ware, Black Slipped ware, carnelian, agate, lapis-lazuli and others demonstrated that Tamils had internal trade with Maharashtra, Gujarat and Gangetic regions through Karnataka and Andhra Pradesh.

The occurrence of foreign materials such as Roman coins, amphorae, Arritine, Torpedo jars, turquoise glazed pottery and others is considered as the stamp of proof that ancient Tamils had international maritime trade with the Arab and Roman worlds several centuries before the common era. The Damili (Tamil-Brahmi) inscribed potsherds found at Khor Rori in Oman, Quesir al Qadim and Berenice in Egypt reflect the fact that Tamils made in roads into these countries and stayed there for a longer period to carry out the maritime trade transactions. Tamils also launched international maritime trade with Sri Lanka and Southeast countries such as Thailand, Malaysia, Indonesia and Vietnam. The maritime trade and

cultural interactions that had begun 2500 thousand years ago still continue with the same vigour and vitality. The seeds for all such achievements and attainments were laid in the Iron Age. The Tamils attained such marvellous status due to the introduction of iron in Tamil Nadu.

Tamil Nadu is known for iron ores, particularly in the Salem region. The iron technology transformed the entire cultural scenario of Tamil Nadu due to its flexibility and sustainability. But, the time of the introduction of iron technology in Tamil Nadu is eluding for both archaeologists and scientists. Now, the answer is achieved in concrete terms with the evidence found at Mayiladumparai. The amalgamation of evidences unearthed at Mangadu and Thelungaur in Mettur taluk of Salem district and today's scientific date obtained for the samples at Mayiladumparai clearly placed the introduction of iron in Tamil Nadu 4200 years ago. The technological know-how achieved four millennium years back by our ancestors is considered to be one of the milestones of Tamils. Since then, the economic and cultural development of Tamils are non-stoppable and we are moving from strength to strength through sustained social development.

I am so glad to place the recent discoveries unearthed at Myiladumparai in the hands of the general public, student community and enthusiasts to understand their rich cultural heritage. Irrespective of these recent achievements, still, we have to go a long way to fill the cultural and chronological gaps in our long glorious history. The government is determined to continue the good works that are being carried out today to achieve the set goals.

(M.K. STALIN)
CHIEF MINISTER

Thangam Thennarasu

Hon'ble minister for Industries,
Tamil official language and Tamil culture, and Archaeology

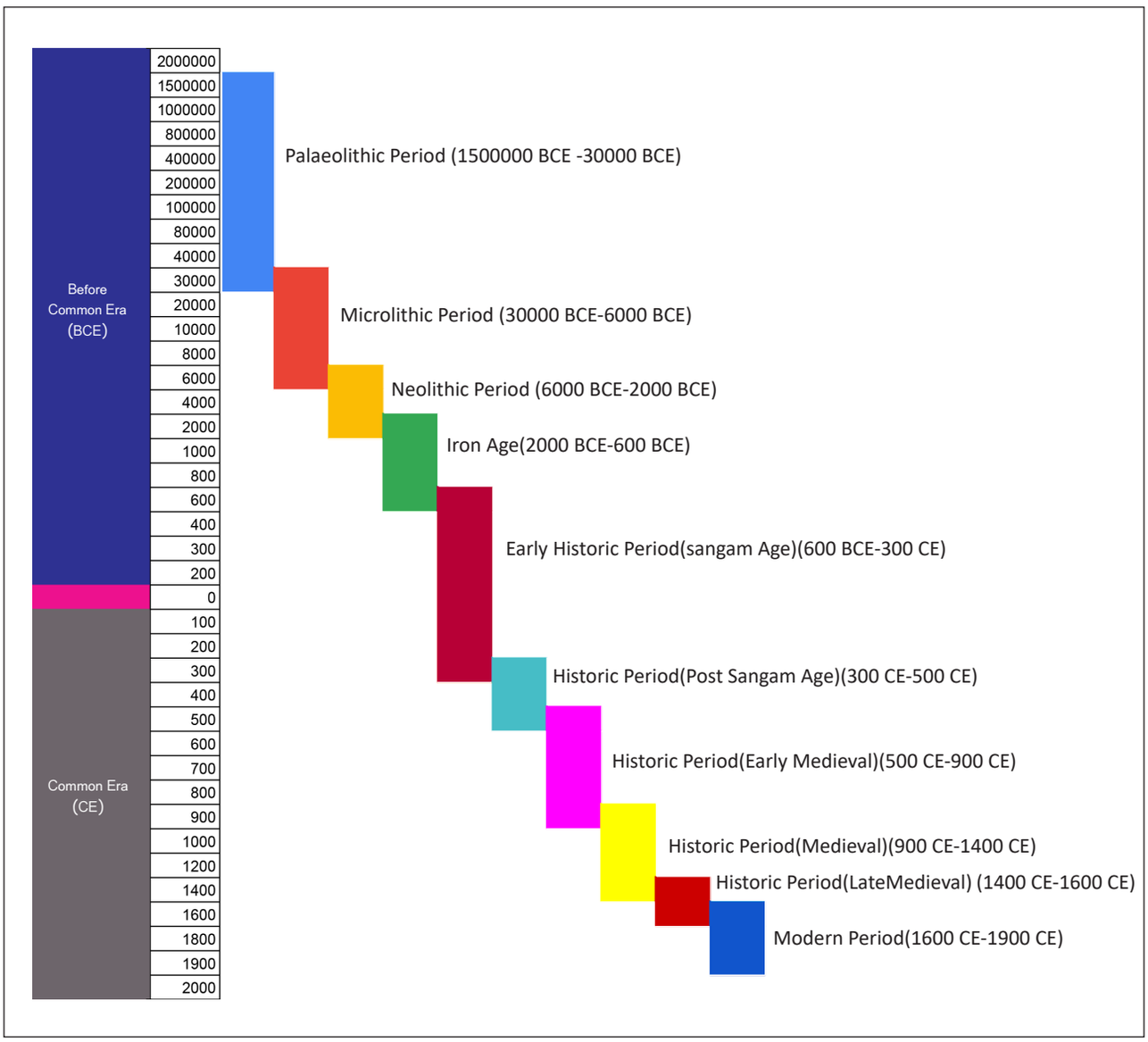
Every human being is always having a great curiosity about their past to understand the roots of their cultural, ethnic, language and territorial affinity. The visible tangible cultural items are studied to construct or deconstruct their imbibed faith. Their living landscape is not merely made of organic or inorganic subsistence rather it is seen as the embodiment of their cultural values that flows through the veins of every substance. The cultural values of a country are emerged, evolved and sustained over a period of time. Thus, the term patriotism is nothing but once attachment to the cultural values and the land in which one grows and nourishes their distant memories with pride. Cultural values are embedded in every sphere of human knowledge. For instance, language and literature are seen as one of the components of the cultural mosaic. Beyond the language and literature, society tries to study, substantiate and strengthen its values through interdisciplinary studies. The one such interdisciplinary subject that provides required inputs to understand their value system is archaeology.

The archaeological explorations and excavations provide required evidences to understand the unbroken cultural link and also helps to fill the cultural gaps that emerged in the course of a long history. The scientific and technological development of the contemporary world always served as a good platform for society to integrate quickly. These technological innovations are reflected in our archaeological records. One such reflection is the origin and growth of iron technology.

The recent archaeological excavations conducted at Mayiladumparai near Krishnagiri provided a much wanted scientific date on the introduction of iron in Tamil Nadu. As per the radiometric dates, the AMS date goes back to 2172 BCE. In this sense, the Tamils who lived 4200 years ago were aware of iron technology. The iron technology pushed economic development, particularly in the field of agriculture due to the availability of defensive and offensive tools and weapons. Agricultural production led to prosperity in every sphere of life. Thus, technological innovation in the field of iron technology transformed the entire life of the contemporary period. For the first time, the Mayiladumparai excavation placed the introduction of iron in Tamil Nadu 4200 years ago.

We felt that it is the duty of the Government to bring the notice of this important evidence to the general public. The present brochure in your hands is the result of this thought process. Needless to say that the Tamil Nadu Government makes every effort to unearth the glorious past through various excavation programmes and also tries to educate the general public and younger generation by providing scientific data for their scrutiny. We do hope that this brochure on the Mayiladumparai excavation would ignite your heart and induce your thrust for understanding your past with pride.

CULTURAL PERIODIAZATION

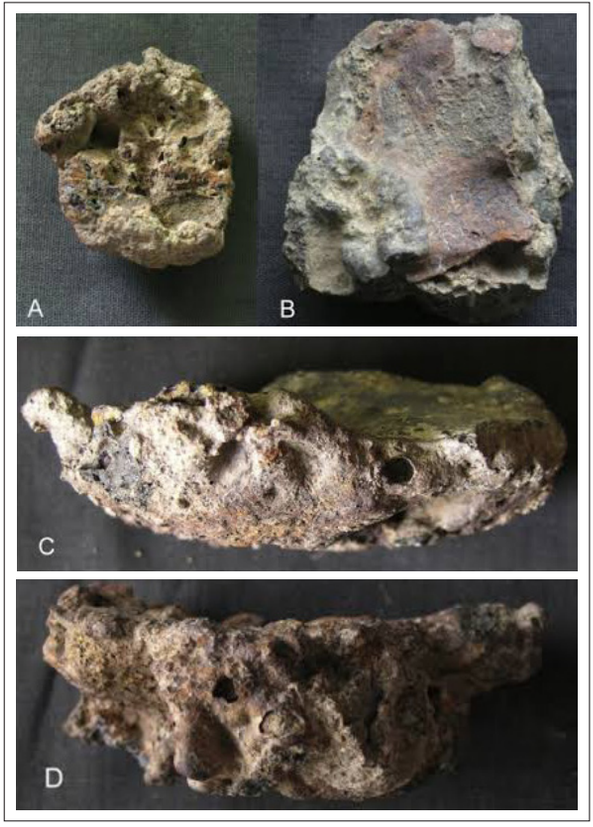


MAYILADUMPARAI

1.DATE OF IRON IN INDIA

The scholars in India always tried to get information on the introduction of iron in India through their archaeological excavations over the past several years. For the first time, the date of iron was fixed to 1300 BCE at Ahar in Rajasthan in the year 1979. The four radiometric dates obtained for the three samples at Bukkasagara in Karnataka placed the earliest iron production to 1530 BCE. Then, the date was pushed back to 1700-1800 BCE in the excavations conducted in the iron smelting site at Raipura (Tiripathi, Vibha.2014: 1010-1014) located in the iron-rich mineral zone of Mid-Ganga valley. The subsequent investigations in the sites at Malhar near Banaras, Uttar Pradesh and Brahmagiri in North Karnataka pushed the date around the second millennium BCE.

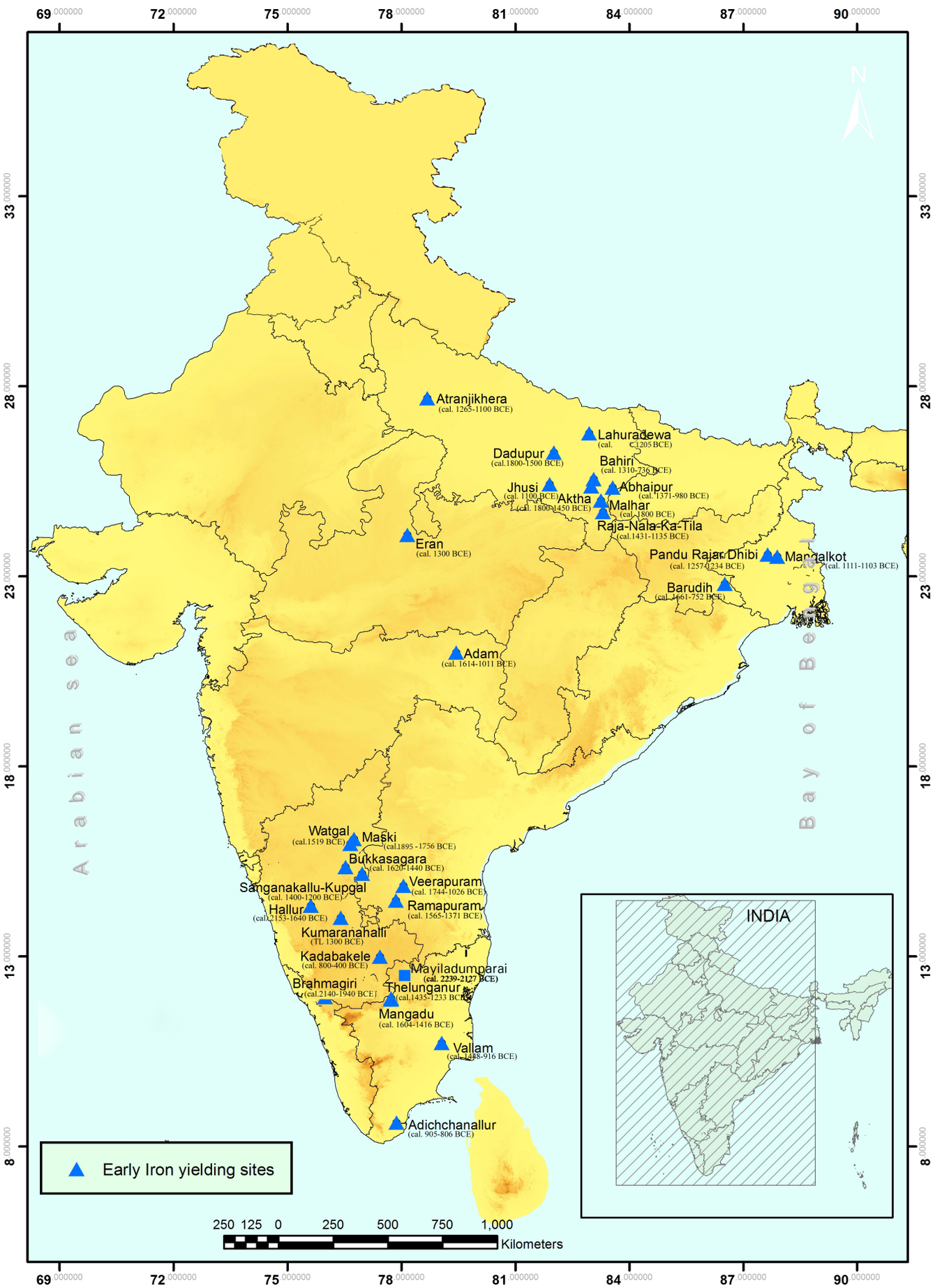
The introduction of iron is considered as one of the most important technological innovations in human history. The introduction of iron helped the ancient people to bring the forest lands into cultivable land and agricultural production has been increased manifold. The surplus agricultural production led to population growth. The population growth led to the formation of societies. The formation of society led to the emergence of clan-based society finally leading to the formation of the state. The establishment of a state with control of territory, men and materials slowly paved the way for economic development in the form of trade and technology. An off-shoot of economic development, the art, architecture, fine arts and other cultural activities accelerated. Thus, there is a complete cultural transformation due to technology. In the technology-driven world, the introduction of any technology that suits and meets the aspiration and expectations of society always served as a catalyst for social transformation. Therefore, the introduction of iron in a particular region is considered as one of the important factors in human development.



Bukkasagara

The date of the introduction of iron in other parts of India is considered as the 2nd millennium BCE. But in Tamil Nadu, this date is eluding for the past several years irrespective of the availability of a large quantity of iron ore in Tamil Nadu, particularly in the Salem region. The recent AMS dates obtained for samples collected from the graves at Mangadu near Mettur in the iron ore bearing zone of the Salem region placed the manufacture of the iron in mid-range calibrated date of 1510 BCE. But, it did not match with all India dates. Therefore, the search for such dates are being continued for several years. Now the answer is obtained at Mayiladumparai near Togarappalli of Krishnagiri district.

Carbonized remains from Raja-Nal-Ka-Tila



Scientific Dates C14 AMS and TL from Iron Age Sites of India

THE C^{14}/AMS DATES FOR IRON AGE SITES OF INDIA

S.No	Site / State	Calibrated C^{14}/AMS dates (BCE)	Mid-range value (calibrated) (BCE)
1	Mayiladumparai / Tamil Nadu	2183 (64.8%) 2266 (15.5%) 2067 15.2%)	2172
2	Brahmagiri / Karnataka	2140 – 1940	2040
3	Hallur / Karnataka	2153 – 1640	1896
4	Maski / Karnataka	1895 – 1756	1825
5	Malhar / Uttar pradesh	1800	1800
6	Raipura / Uttar Pradesh	1720	1720
7	Dadupur / Uttar pradesh	1800 – 1500	1650
8	Aktha / Uttar pradesh	1800 – 1450	1625
9	Bukkasagara / Karnataka	1620 – 1440	1530
10	Watgal/ Karnataka	1519	1519
11	Mangadu /Tamil Nadu	1604 – 1416	1510
12	Ramapuram/ Andrapradesh	1565 – 1371	1468
13	Veerapuram/ Andrapradesh	1744 – 1026	1385
14	Thelunganur / Tamil Nadu	1435 – 1233	1334
15	Adam / Maharashtra	1614 – 1011	1312
16	Sanganakallu– Kupgal / Karnataka	1400 – 1200	1300
17	Eran / Madhya Pradesh	1300	1300
18	Raja- Nala-Ka-Tila / Uttar Pradesh	1431 – 1135	1283
29	Pandu Raja Dhibi / West Bengal	1257 – 1234	1245
20	Barudih / Jharkhand	1661 – 752	1206
21	Lahuradewa / Uttar Pradesh	1205 BCE	1205
22	Attranjikhera / Uttar Pradesh	1265 – 1100	1182
23	Abhaipur / Uttar Pradesh	1371 – 980	1175
24	Vallam / Tamil Nadu	1418 – 916	1167
25	Jhusi / Uttar Pradesh	1100	1100
26	Bahiri / West Bengal	1310 – 736	1023
27	Adichchanallur / Tamil Nadu	905 – 806	855
28	Kadabakele / Karnataka	800 – 400	600

2. INTRODUCTION OF IRON IN INDIA

The date of the introduction of iron in India experienced a vibrant academic debate for a long time. The scholars from the West insisted initially that the technology has developed in Asia Minor and from there the iron technology has been percolated in different parts of the world. Through this statement, they wish to insist that civilized society emerged in Asia Minor due to iron technology. To counter this hypothesis, all the countries tried to get the date of introduction of iron in their respective countries.

Now, there is a broad convergence among the scholars of India due to the emergence of new radiometric dates. The dates such as ca.1300 BCE at Ahar (Sahi1979:365-368; 1991:211-216), ca. 1200 BCE at Nagda, and cal. 1182 BCE at Atranjikhera (Agrawal 2003; Tewari 2003:536-544; Chakrabarti 1992) led the scholars to place the origin of iron somewhere between 1300 BCE and 1100 BCE based on the radiometric dates in which context the iron was recovered.

The recent investigations further push the origin of iron in India somewhere around 1500-1400 BCE or much earlier in the heartland and peninsular India (Tripathi 2008:28). The four radiometric dates obtained for the three samples of wood charcoal taken from the forge and one from the ashy dung deposits at Bukkasagara placed the earliest iron production to mid-range date of 1530 BCE (Johansen 2014:256–275).

The iron smelting Malhar located in the iron-rich mineral zone of Mid-Ganga valley in the heartland of India push the origin of iron further back to1800 -BCE (Tewari 2003, 536–44; Tewari et.al. 2002:54–62). The subsequent investigations in the sites like at Malhar near Banaras (Tewari et al., 2000:69–98) and Hallur and Brahmagiri in North Karnataka pushed the date back to 1900-2000 BCE (Devaraj et al., 1995:57–74). The series of dates obtained from different ecological zones clearly placed the introduction of iron in India prior to 1800 BCE (Tewari 2010:81–97).

Clay furnace- Malhar

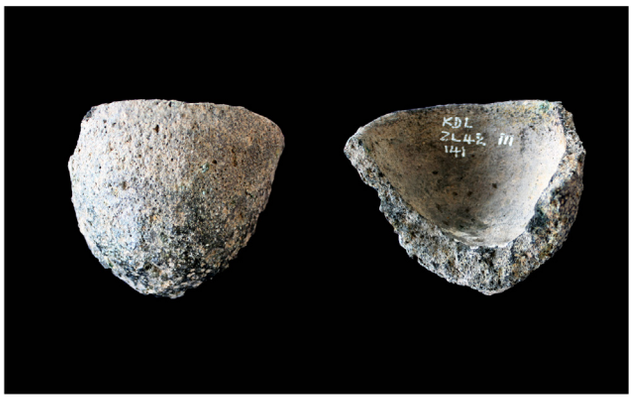
Iron artefacts - Malhar

Iron objects - Raja-Nala-Ka-Tila

3. ANCIENT STEEL IN INDIA

The high carbon crucible steel technology is considered as one of the finest achievements of south Inidia, which fetch a lot of foreign exchanges to south India. There are two methods in the manufacturing of steel namely the carbunization method and the decarbunization method. In the first method, the carbon is added to the wrought iron. In the second method, carbon is removed from cast iron. These processes are being carried out with the help of crucibles. Therefore, it is called as crucible steel or wootz steel. The term wootz is the anglicization of the Tamil word *ekku* or Kannada/Telugu *ukku*. The presence of 1.5 to 2.0% of carbon in the iron is considered as high carbon steel. The Kodumanal and Mel-Siruvalur findings in Tamil Nadu could be cited as the finest examples of crucible steel.

Crucible- in-situ



Crucible-Kodumanal

Iron ingots- Konasamudram

Date of Steel

Recent investigations of the Indian wootz process have concentrated on material from the known sites of Konasamudram, Nizamabad District, Andhra Pradesh and Gatihosahalli in the Chitradurga district of Karnataka. These investigations have shown the existence of specialized, standardized and semi-industrial production techniques dating from at least the late medieval period. During

Tuyere and debris from bloomery iron smelting area, Mel-siruvalur.

field investigations of copper mining and smelting in South India, Jaikishan came across several sites in northern Telangana (Jaikishan, et.al., 2007:445-460) and Sharada Srinivasan came across a previously unrecorded archaeo-metallurgical site in Mel-Siruvalur, South Arcot district, Tamil Nadu (Srinivasan 2007: 673–96).She identified the high carbon steel at Kodumanal and finally from Kadebakele with a secured date of 880-440 BCE.

Crusible furnace - Kodumanal

Identification of these production centres supports the idea that wootz steel production was relatively widespread in south India and extends the known horizons of this technology further. In addition, Park and Shinde (2013) found some high carbon steel products among

Cairn circle - Thelunganur

Top: Iron sword-Mangadu | Bottom: Iron sword- Thelunganur

the iron artefacts excavated from the 2nd century BCE to 1st century CE site at Junnar in Maharashtra (Park and Shinde 2013: 3822-3833).The crucible furnace unearthed at Kodumanal firmly dated to the 6th century BCE based on radiometric dates and also based on associated findings such as Punch-Marked coins, Northern Black Polished ware, rouletted ware and more than 500 Brahmi inscribed potsherds collected from well-stratified context.

The recent AMS dates obtained for samples collected from the graves at Thelunganur and Mangadu near Mettur in iron ore bearing zone of Salem region placed the manufacture of the steel somewhere around 13th century BCE. Naturally, the scholars believed that the introduction of iron in Tamil Nadu may go back to 2nd Millennium BCE. But, scientific dates were till date lacking. Finally, the present AMS date obtained at Mayiladumparai established the fact.

4. IRON AGE CULTURE

In his long journey, man has improved his life and the associated society to by using various technologies. This technological development has not taken place in a few years. The development of thousands of years. For example, it took thousands of years to change from the use of stone tools to metal tools. The use of copper in India may be said to have originated in the Indus valley culture about 5,000 years ago. The period in which copper was used was also known as the copper culture. The period in which iron was used was also known as the Iron Age Culture.

COPPER

The people of the Indus valley culture did not know the use of iron. Excavations carried out in places where the Indus valley culture is situated have not yielded any iron objects. After copper was discovered, majority of the tools was made of out of copper. Since copper is a metal that can melt at low temperature, tools made of copper were flexible and brittle and were not useful to make strong tools. For instance, there was difficulty in clearing the dense forests and bringing land to agriculture. It may be said that the deforestation took place only after the use of iron.

IRON

Iron objects are found in association with ritual objects in excavations, especially in megalithic burials. We are well aware that iron was a part of the lives of the people of that time as the iron is found in all sepulchral monuments. The researchers hypothesized that the use of stone tools started decreasing after the appearance of iron and the use of iron tools gradually increased. Initially, there was a difference of opinion as to where iron making technology first appeared. This technology originated in Asia Minor and gradually spread to other parts of the world, and this hypothesis was put forward based on cultural diffusion theory. Scholars do not accept this hypothesis as it is now available in many parts of the world at the same time. Dr. Dilip Chakrabarthi, Professor at the University of Cambridge, thinks that the Indians discovered the iron because of the fact that there was a large number of iron objects in the areas of Central India and South India.

USES OF IRON

One of the most important occupations of the Megalithic peoples was the manufacture of iron and the making of iron tools. Iron tools are found in most megalithic monuments and settlements. Since the discovery of iron, the life of the Stone Age peoples has progressed very rapidly. Especially in Tamil Nadu, due to the abundance of iron ores, one could witness the use of iron and the subsequent economic development . Iron is a strong material.

These enabled them to do a lot more work than before and to move quickly in economic scale. It helped a lot in agricultural production. Until then, those who had used stone ploughshare shifted to iron ploughshare which helped to bring the larger area under cultivation quickly and rapidly. By cutting trees with help of axes, they could bring a larger area under cultivation. They increased food production by cultivating crops in the their places, and they began to store and distribute the surplus agricultural products produced in excess of the demand. Transportation is essential to transport such goods from one place to another. Therefore, bullock carts, chariots, etc., having wheels fitted with iron axle and ferrule, Accelerated the movements.

As a result, the transport of goods to other places was made easier. They created more iron weapons too. These factors led to the development of economic progress, stable life in one place, a transformation from the rural economy to more urban life, and the development of technologies for the creation of the essential objects necessary for their life. The closeness and cohesiveness between the people also led to the spread of language and written script. These developments of iron technology led them to name the culture as Iron Age culture that happened in the contemporary period.

STEEL MAKING

Steel is an advanced technology of iron. Steel has a stronger sharpness than iron. The word steel is used in Tamil literature in the context to denote instruments such as vel, sword, etc. *Padirruppattu* refers to the steel as *ekkutaiyirumpin ullamaittu* meaning the structure of the steel edifice. (*Padirruppattu* 74-13).

IRON IN SANGAM LITERATURE

There are many references in Sangam literature to iron, to the use of iron, and to the methods of making iron weapons. Literature refers to iron as 'blacksmiths' and 'blacksmiths with strong hand'. One of the *Purananuru* poems speaks of the blacksmith as follows:

"கருங்கைக் கொல்லன் செம்தீ மாட்டிய
இரும்பு உண்நீரினும் மீட் டற்கு அதிது என" (புறம்.21)

There are many poems that speaks about instruments such as arrowheads, spears, axes, swords, etc., made of iron, and about sharpening them in the furnace. It can be said that the iron industry was very advanced from the fact that many fine words about the iron industry find a place in Tamil literature. One could realize that the iron technology was in an advanced stage as one could find many fine technical terms in Tamil literature.

'இரும்புசெய் கொல்லன் வெவ்வுலை
தெளித்த தோய்மடல் சில்நீர் போல' (நற்றிணை-9)

According to the literature *Narrinai*, the furnace is occasionally sprinkled with some water to keep the fire in the same temperature even when iron is boiled.

"ஈன்று புறந்தருதல் என்தலை கடனே
சான்றோன்ஆக்குதல் தந்தைக்கு கடனே
வேல்வடித்து கொடுத்தல் கொல்லற்கு கடனே
நல்நடை நல்கல் வேந்தற்கு கடனே" (புறம்.312)

The *Purananuru* provides a graphic reference on the duties of oneself, father, blacksmith and the king.

In Sangam literature *Purananuru*, *Avvaiyar* heard that a chieftain Tondaiman proposed to invade against his best friend, Adhiyaman. She went to the court of Tondaiman as an ambassador with an intention to stop the war. Then she praised Tondaiman in hyperbole tone by indirectly praising Adhiyaman.

பீலி அணிந்துமாலை சூட்டிக்
கண்திரள் நோன் காழ்திருத்தி நெய்அணிந்து
கடி உடைவியன்நகர் அவ்வே; அவ்வே
பகைவர்க்குத்திக் கோடுநுதி சிதைந்து
கொல்துறைக் குற்றிலமாதோ என்றும் (புறம்.95)

In this song, all your weapons of war are shiny, very beautiful, majestic, and strong. You have garlanded them with peacock toads and kept them safely in the palace. But all of Adhiyaman's weapons are lying in the blacksmith's workshop. Their weapons are broken by stabbing the enemy to death. Their ends are shattered and the handles are broken and are wasted. Blacksmiths are always repairing and repairing them, he sings in a sly manner, scorning Thondaiman and indirectly praising Adhiyaman. The Sangam literature testifies that in the Sangam Age all the weapons of war were made of strong steel and iron. As an extension of the Iron Age culture, we find that the use of iron was high even in the Sangam Age. One could understand the various techniques involved in iron production such as identification of iron ore, extraction of iron from iron ore, smelting of iron, production of iron and steel and the making of various weapons through Sangam literature.

5. ARCHAEOLOGICAL SETTINGS OF MAYILADUMPARAI

Mayiladumparai (78º 18' 48" E; 12º 25' 12" N) is a small hamlet located at the foothill about 3 km west of Togarapalli village in Bargur taluk of Krishnagiri district. The intensive archaeological explorations carried out in the 9600 sq.m area yielded rich data ranging from Palaeolithic times down to the medieval period (Narasimhaiah 1980; Raman 1977-78:50; Rajan 1991:37-52, 1997:125-195). The archaeological explorations conducted by K.Rajan in 1989 brought to light 2 Palaeolithic sites, 5 Neolithic sites and 170 Iron Age sites and quite a number of historical sites. Besides, ten sites with rock paintings and about 125 memorial stones belonging to early medieval times were also discovered (Rajan 1991a:51-70; Rajan 2000:138-189). Among them, Mayiladumparai is one of the important sites of this region yielding cultural material ranging from Microlithic to Early Historic times. This site is situated in the midst of several archaeological sites such as Togarapalli, Gangavaram, Sandur, Vedarthattakkal, Guttur, Gidlur, Sappamutlu and Kappalavadi. The presence of a 13th-century trade guild inscription at Aikundam close to Mayiladumparai suggests that it was on the ancient trade route. All these important archaeological sites lie within a radius of 10 km.

B.Narasimhaiah conducted a trial excavation in 1980 at a habitation-cum-burial site Togarapalli yielded 20 cm thick cultural deposit with Neolithic pottery such as coarse red ware, tan ware, brown ware, grey ware and black ware (Narasimhaiah 1980:29-40). This site also met with 15 memorial stones (Rajan 1977:166-167). The site Gangavaram located 3 km from Sandur yielded nearly 50 cairn circles entombing cist burial and four memorial stones. Gidlur situated 1km before Togarapalli is encountered with more than 100 cairn circles. At Kappalavadi, B.Narasimhaiah collected hand axes, ovates, choppers, chopper-chopping tools, miniature hand axes, awl-cum-scrapers, axes, hammer stones, wedges, blade flakes and a cylindrical cores made on dolerite with heavy patination. B.Narasimhaiah designated these tools to pre-Neolithic stone industry (Narasimhaiah 1980:19-31). Subsequent exploration by Prof. K.Rajan dated these materials to Middle Palaeolithic times taking into account of the identical tools discovered at Varatanapalli in Krishnagiri taluk of the same district (Rajan 1977:167). The recent explorations conducted by the Tamil Nadu State Archaeology Department under the direction of

Trade guild inscriptions - Aikundam

Prof.K.Rajan, Prof.Shanti Pappu, Dr.Akhilesh Kumar, Dr.R.Sivanantham and Tmt. K. Bakialakshmi in the year 2021 clearly proved that these tools are belonging to the Neolithic times.

Another site Sappamuttlu lies about 5 km from Togarapalli-kut road yielded more than hundred cairn circles. Vedarthattakkal, an important site, lies on the Krishnagiri - Pochchampalli road at a distance of 13 km from Krishnagiri has habitation found at two places, one at the foothill and another on the hillock near the perennial pond. The earlier mound yielded black-and-red ware, red ware and red slipped ware. The latter mound yielded a dull coarse red ware. The Iron Age monuments are found all around the village with much concentration towards the hill. The famous Sandur *vatteluttu* memorial stones, presently housed in the Tamil State Archaeology Department Museum at Dharmapuri,

Neolihic tools

Neolithic grooves - Mayiladumparai

are found at the foothill. The site Sandur and Vedarthattakkal may be considered as a single cultural unit to understand the site settings. All the above vatteluttu inscriptions are dated to the 7th - 8th century CE (Nagasamy 1975; Pungundran 1989; Rajan 1997).

Thus, one may reasonably presume that Mayiladumparai is ideally situated in the midst of contemporary sites and it is suited for the continuous occupation from Microlithic times to the Early Historic period. There are more than 2000 Iron Age burials, five rock shelters with paintings, nearly 20 perennial ponds and 30 memorial stones, all fall in within a radius of 10 km. This emphasizes the potentiality of the region in which the present site Mayiladumparai is situated. The site is embedded with four distinctive cultural deposits

Vatteluttu Memorial stones - Sandur

ranging from Microlithic times to the Early Historical period.

The rock shelters located at different altitudes around this site had engravings and paintings executed with white and red pigments. The rock shelters, habitation mounds and the adjoining burial complexes cover an area of more than 40 hectares. The settlement yielding Microlithic tools is observed in one of the shelters. Another rock

shelter yielding Neolithic habitation deposit in association with rock engravings is found on the eastern end of the hillock *Sāṉṟōrappaṉmalai* (locally called *Sāṉārappaṉmalai*). The important habitation mound called *karuvōṭṭuppaḷḷam* (the valley studded with black ware) yielding both Neolithic and Iron Age ceramics is found on the left bank of the rivulet *Tāḷapaḷḷam* and at the foothill of *Sāṉṟōrappaṉmalai.* Another patch of habitation mound is noticed behind the *Sāṉṟōrappaṉmalai* in a place called *Puṭṭalappaṉkuṭṭai* on the slope of *Kavaraṭṭimalai.*The habitation mounds are found in patches on flat surfaces encircled by big boulders.

The long survival of the site with the pastoral economy could be attributed to the presence of a large number of perennial ponds. The people living in surrounding areas, even today, depend heavily on these ponds. During prehistoric times, this would have been still in better condition and sustained the needs of the Neolithic, Iron Age and Early Historic settlers.

6. MAYILADUMPARAI EXCAVATIONS

5.1 Introduction

The excavation conducted in the year 2021 at Mayiladumparai in Krishnagiri District of Tamil Nadu yielded two important AMS dates that provide a clue for understanding the introduction of iron and also the transformation from the late Neolithic Phase to the Early Iron Age. The site met with Neolithic and Iron Age habitation mound in the terraces of the hillock called *Sāṇārappaṉmalai* (a corrupt form of Sāṉṟōr-*appaṉ-malai*). The rock shelter at the top of the hill yielded habitation materials with a petroglyph. The rock art with paintings both in red and white pigments was observed in the rock shelter called *nekul-juṉai* (a corrupt form of *niḻal suṉai)* and the grooves used for polishing Neolithic celts were also noticed near the rock shelter. Mayiladumparai also met three rock shelters with rock art within a radius of 1km and several Iron Age megalithic monuments were documented. Fifteen Iron Age megalithic monuments were opened in 2021 by Tamil Nadu state Archaeology Department with various types such as cairn circle entombing cist burial having U-shaped porthole and round porthole facing west and east. The chamber tombs also met with innumerable black-and-red ware, black slipped ware and red ware pots kept as grave goods in association with iron objects.

Sarchophagus - Mayiladumparai

Besides, a sarcophagus is also noticed inside the chamber in one of the graves. The habitation-cum-burial site was first excavated in the year 2003 by K.Rajan of Tamil University and based on the promising results; the excavation was resumed in 2021 by Tamil Nadu State Archaeology Department. The trenches laid in the Locality-4 in the present excavation yielded two important AMS dates. The two dates were obtained at the depth of 104 cm and 130 cm which yielded the date of the uncalibrated conventional AMS date of 1360 BCE and 1810 BCE. The mid-range calibrated dates for the said two dates are 1615 BCE and 2172 BCE respectively. These two dates cleared placed the introduction of iron in Tamil Nadu 4200 years ago due to the introduction of iron technology. The entire cultural development has taken a new beginning 4200 years ago. Thus, it is clearly emphasize that any new and affordable technology can change society. The seed and the foundation for the development the of Sangam Age around 600 BCE is laid about 4200 years ago.

These dates were sent to *Padmasri* Prof. Dilip K.Chakrabarti, Cambridge University, *Padmasri* Prof. K.Paddayya, Former Director, Deccan College, Pune, Dr. Rakesh Tewari, Former Director General of Archaeological Survey of India, Prof. Vibha Tripathi, Former Professor, Banaras Hindu University, Prof. Ravikori Settar, Former Professor, Karnataka University and Prof. P.J.Cherian, Former Director, Kerala Council of Historical Research to get their opinion. All the scholars unanimously acknowledged and appreciated the new dates.

5.2 Previous Excavations

The excavations conducted in 2003 by K.Rajan yielded cultural material from microlithic to Early Historic. The cultural remains encountered at Mayiladumparai indicate the existence of various subsistence patterns and it covers a wider area (Rajan 2004:74-89). The rock-shelters with Microlithic remains occupy on the western part of the site. The Neolithic remains are found at two levels. One in the rock-shelter found at the top of the hillock *Sāṉṟōr-appaṉ-malai* and another at the foothill of *Karuvōṭṭupaḷḷam.* The Iron Age habitational deposits are found in the mounds of Karuvōṭṭupaḷḷam. The burials are spread out in the southern, southeastern and western parts of the site. To understand each of the cultural remains in its own settings, a systematic excavation is conducted at different locations. In total, five trenches and an Iron Age burial are opened. The first trench is laid in the rock-shelter to identify the nature of the Microlithic deposit. The second trench is laid in the rock-shelter located on the top of the hillock. The remaining three trenches are laid at the foothill of *Sāṉṟōr-appaṉ-malai* locally called Sanarappanmalai. The five trenches and an Iron Age burial yielded cultural deposits ranging from Microlithic times to the Early Historic period. Each cultural aspect is dealt with separately to understand its nature.

Microlithic Culture

The rock-shelter, called *kūcikuṇḍu,* located on the southern side of the *tēṉbōl hillock* is selected for excavation as it was less disturbed and showed a considerable amount of habitation deposit. The initial goal of the selection of the rock-shelter is to see if there is any human occupation during prehistoric times, particularly during the Neolithic. Quite interestingly, it yielded more than a metre single cultural deposit belonging to the Microlithic period. A metre square trench laid on the cave floor at the centre of the shelter yielded one metre thick deposit containing microlithic tools found in association with bones. The tools recovered from the site are classified into blades, points, borers, burins, lunates and scrapers based on their techno-morphic characters. The crystalline stone variously termed as quartzite or vein quartz is the most common material used at this site, except for a solitary example of a chert.

Microlithic tools - Mayiladumparai

Neolithic Culture

The remains of the Neolithic culture are found in two different geographical settings at this site.

The first one is noticed in the rock-shelter located on the top of the *Sāṉṟōr-appaṉ-malai* and the second one is observed as a cultural deposit below Iron Age phase in the habitation mound found at the foothill locally called *Karuvōṭṭupaḷḷam*. The shift in the Neolithic settlement is reflected in the cultural material too. The material remains exposed in the rock-shelter suggests an earlier date. It seems the Neolithic people first settled and lived in rock-shelters and later on moved over to the plain as a sequential to change in their subsistence pattern. The former settlers would have depended more on the cattle raiding as the shelter lies on the top of the hill and hardly there is any scope for any agricultural activities and the latter would have lived upon both cattle raising and rudimentary agriculture.

Excavation at Rock-shelter

There are numerous rock-shelters found on the southern slope of the hillock *Sāṉṟōr-appaṉ-malai*. One of the rock-shelters, locally called *mettakam* lies below *vilakkuvachchakundu*, facing south yielded a Neolithic deposit. The shelter had a flat base and a semi-circular top ceiling. It measures 9.20 m in length and 3.15 m in breadth and had a total height of 1.40 m. One of the interesting features of the shelter is the presence of the three rock-engravings were found engraved deeply at the entrance. Such engravings were reported earlier at Edakkal in Kerala (Gurukkal and Raghava Varier 1999:85-95) and at Perumukkal (Rajan 1997:304) in Tamil Nadu. The careful excavation carried out inside the shelter yielded an 85 cm cultural deposit. The notable cultural material unearthed in the rock-shelter is handmade red ware.

Rock shelter - Mayiladumparai

Excavation at Habitation mound

K.Rajan laid three trenches (MPI- I, II and III) laid in the habitation on the left bank of

Petroglyphs - Perumukkal, Villuppuram District

Petroglyphs - Edakkal, Kerala

the stream Talapallam yielded Neolithic cultural deposit below the Iron Age phase. The Tamil Nadu State Archaeology laid 6 trenches or the slope of the hill. The total cultural deposit of 1.55 m yielded three cultural phases namely Neolithic, Iron Age and Early Historic without any cultural break, which clearly indicates the cultural transformation from the Neolithic to Iron Age. The 20 cm cultural deposit contains Neolithic material such as celt embedded in a floor found in association with postholes. In association with Neolithic celt, handmade Neolithic red ware with a micaceous exterior surface is observed.

Habitation mound - Mayiladumparai

Iron Age Culture Burial Complex

The impressive burial complex of about 1000 burials is distributed over 40 hectares (100 acres) of the undulated rocky terrain dissected by numerous water bodies.

Most of the burials are cairn circles. In a few of them, cist is partially exposed due to the removal of the cairn packing by the cultivators of the field. In total 16 graves were

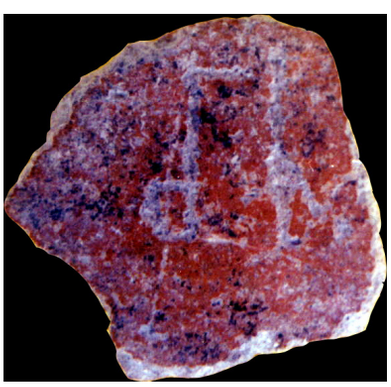
Cist burial with a huge capstone - Mayiladumparai

opened. The careful exposure of the burial reveals that the funerary rituals are performed not only inside the cist but also outside of it. A group of pottery assemblages is found at three different parts within the circle but close to the inner edges of the circle consisting of a ring stand of black slipped ware, a medium-sized pot of red slipped ware and a lid of a black-and-red ware. The pottery found inside the cist seems to have been offered at two stages. The pottery repertoire found at the base of the cist consists of a conical vase, a conical profiled small bowl and a large-sized shallow bowl. The outer surface bears faint traces of graffiti marks in the form of a human being. The basal part of the bowl was purposefully pierced with a hole. All the utensils except the shallow bowl are placed facing west. The second stage of funerary goods consists of a pot made on red slipped ware. The deliberate piercing of this pot at the bottom portion is again repeated in this stage also. Though the exact function of the hole is far from clear at the moment, it would not be wrong to infer that it might have contained water when the hole was made. The iron objects recovered from the cist altogether are confined to the eastern part only. The majority of the iron objects belong to the category

Iron objects

of small-sized knives, a bunch of arrowheads of tanged and plain variety, sword , axe etc.,

The offerings found in this area are kept with utmost care over a legged handmade terracotta pedestal. The iron artefacts retrieved from the pedestal form large-sized objects identifiable as an axe, a long-sized sword/knife and a small-sized knife with a pointed handle. The long-sized sword/knife is placed below the axe while the small knife is kept close to it. The transformation from Iron Age to Early Historic is well attested by the solitary finding of a potsherd with a short Tamil-Brahmi inscription reading *ca ta*, engraved on the shoulder portion of the pot on its exterior surface. It is collected from the topmost level of the habitation trench. In association with an inscribed potsherd, a graffiti-bearing potsherd is also collected. This graffiti mark looks like Brahmi *ma* and is deeply engraved on the shoulder portion of a pot. Other important findings are a solitary example of russet coated ware, terracotta beads and hopscotch.



5.3 Present Excavations

In total, 9 trenches were laid in the habitation mound and 15 graves were opened. Out of the 9 trenches, 6 trenches were laid in Locality i-V in *Karuvōṭṭupaḷḷam* a the foothill of *Sāṉṟōrappaṉ-malai* and three trenches were laid at the foothill of *Kavuraṭṭimalai*. The excavations yielded handmade pottery and burnished ware of Neolithic times. Black-and-red ware. Black ware, red slipped ware and red ware of Iron Age and red ware, russet coated ware, rouletted ware and brown slipped ware of Early Historic times. The black-red-red ware is appeared in the late phase of the Neolithic period.

Copper ring, Spindle - whorls, Hopscotches

The important antiquities are hop-scotches, burnishing tools, spindle-whorls, shell bangles, terracotta beads, copper rings and iron points and arrowheads. Besides, graffiti, mainly as post-firing scratched marks, are found both in the habitation and graves. Though mostly geometric in the form they sometimes resemble natural objects such as the sun, fish and man, and sometimes man-made objects such as the ladder, bow and arrowhead.

In the Iron Age megalithic graveyard, 15 megalithic monuments mostly consisting of carin circles entombing cist burials were exposed. The cists facing east, south and west were identified with both round and U-shaped potholes. One of the graves contains a sarcophagus thereby indicating its contact with deltaic and coastal zones. The main graves goods placed inside the chamber are iron knives, arrowheads, short and long swords, spearheads and axes. A solitary finding is a copper and ear stud. A long sword measuring 87 cm in length was recovered from a grave (MEG-X). The ceramic assemblages consist of black-and-red ware, red slipped ware, black slipped ware and red ware. The major types are bowls, globular pots, ring stands, three-legged jars, conical vases and ring stands.

Grave goods

The cultural items unearthed in the excavations revealed that the site was survived from Neolithic times to the historical period. The Microlithic, Neolithic, Iron Age, Early Historic and Historic are the five cultural sequences identified based on ceramics, iron objects, rock art, memorial stones and inscriptions.

Iron swords,arrowhead and cisels

7. ROCK PAINTINGS

There are three rock shelters depicted with rock paintings. The first rock shelter called *nekul-junai* (corrupt form of *nil̲al-su̲nai*) located near the habitation mound yielded rock paintings. The paintings were applied invariably by using both white and red pigments. The red pigment is superimposed by white pigment thereby indicating an earlier date to the red pigment. The non-occurrence of any habitation material in the rock shelter suggests that these are executed on some special occasions. Fighting scene, tilling a land, dancing in a row, riding a horse men with cattle, etc., are some of the scenes portrayed by them. In a few cases, the bow and arrow were raised above the head of the man in a position of charging an arrow pointing upward. Otherwise, men are shown in a fighting posture, holding the bow and arrow against each other. This recalls the sculptural panel of the later-day memorial stones found in the area.

Perennial pond - Mayiladumparai

White pigment Rock art - Mayiladumparai

Red pigment Rock art - Mayiladumparai

Besides, two more rock shelters namely *Buddlappaṉ Koṭṭāi* and *Muṉiyappaṉ thoṭṭi* are noticed at Mayiladumparai.

Buddalappan kottai - Mayiladumparai

Muniyappan Thotti - Mayiladumparai

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REPORT OF RADIOCARBON DATING ANALYSES

Ramalingam Sivanantham
Tamil Nadu Department of Archaeology

Report Date: March 14, 2022
Material Received: February 28, 2022

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
Beta - 620258	**MLP1-003**	**3310 +/- 30 BP**	IRMS δ13C: -25.4 o/oo

(93.9%)	**1634 - 1504 cal BC**	**(3583 - 3453 cal BP)**
(1.5%)	**1669 - 1656 cal BC**	**(3618 - 3605 cal BP)**

Submitter Material: Charcoal
Pretreatment: (charred material) acid/alkali/acid
Analyzed Material: Charred material
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: 66.23 +/- 0.25 pMC
Fraction Modern Carbon: 0.6623 +/- 0.0025
D14C: -337.71 +/- 2.47 o/oo
Δ14C: -343.45 +/- 2.47 o/oo (1950:2022)
Measured Radiocarbon Age: (without d13C correction): 3320 +/- 30 BP
Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP). "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.

BetaCal 4.20

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL20)

(Variables: d13C = -25.4 o/oo)

Laboratory number **Beta-620258**

Conventional radiocarbon age **3310 ± 30 BP**

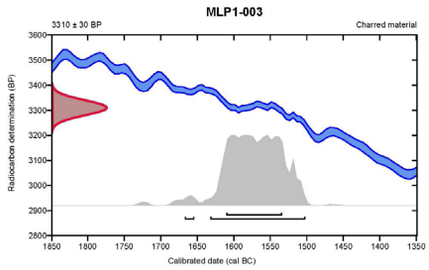
95.4% probability

(93.9%)	1634 - 1504 cal BC	(3583 - 3453 cal BP)
(1.5%)	1669 - 1656 cal BC	(3618 - 3605 cal BP)

68.2% probability

(68.2%)	1612 - 1536 cal BC	(3561 - 3485 cal BP)

MLP1-003



Database used
INTCAL20

References
References to Probability Method
Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.
References to Database INTCAL20
Reimer, et al., 2020, Radiocarbon 62(4):725-757.

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REPORT OF RADIOCARBON DATING ANALYSES

Ramalingam Sivanantham
Tamil Nadu Department of Archaeology

Report Date: March 14, 2022
Material Received: February 28, 2022

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
Beta - 620259	**MLP1-004**	**3760 +/- 30 BP**	IRMS δ13C: -24.6 o/oo

(64.8%)	**2239 - 2127 cal BC**	**(4188 - 4076 cal BP)**
(15.5%)	**2287 - 2246 cal BC**	**(4236 - 4195 cal BP)**
(15.2%)	**2093 - 2041 cal BC**	**(4042 - 3990 cal BP)**

Submitter Material: Charcoal
Pretreatment: (charred material) acid/alkali/acid
Analyzed Material: Charred material
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: 62.62 +/- 0.23 pMC
Fraction Modern Carbon: 0.6262 +/- 0.0023
D14C: -373.79 +/- 2.34 o/oo
Δ14C: -379.22 +/- 2.34 o/oo (1950:2022)
Measured Radiocarbon Age: (without d13C correction): 3750 +/- 30 BP
Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP). "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.

BetaCal 4.20

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL20)

(Variables: d13C = -24.6 o/oo)

Laboratory number **Beta-620259**

Conventional radiocarbon age **3760 ± 30 BP**

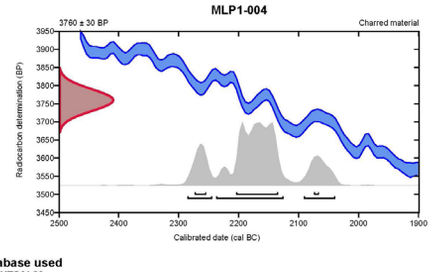
95.4% probability

(64.8%)	2239 - 2127 cal BC	(4188 - 4076 cal BP)
(15.5%)	2287 - 2246 cal BC	(4236 - 4195 cal BP)
(15.2%)	2093 - 2041 cal BC	(4042 - 3990 cal BP)

68.2% probability

(55%)	2206 - 2136 cal BC	(4155 - 4085 cal BP)
(9.9%)	2275 - 2256 cal BC	(4224 - 4205 cal BP)
(3.3%)	2076 - 2068 cal BC	(4025 - 4017 cal BP)

MLP1-004



Database used
INTCAL20

References
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8. SUM-UP

The excavation conducted in the year 2021 at Mayiladumparai in Krishnagiri District of Tamil Nadu yielded two important AMS dates that provide a clue for understanding the introduction of iron and also the transformation from the late Neolithic Phase to the Early Iron Age. The site met with Neolithic and Iron Age habitation mound in the terraces of the hillock called *Sāṇōrappaṉmalai.* The rock shelter at the top of the hill yielded habitation material with a petroglyph. The rock art with paintings both in red and white pigments was observed in the rock shelter called *Niḻal-suṉai (nekul-juṉai)* and the grooves used for polishing Neolithic celts were also noticed near the rock shelter. The habitation-cum-burial site was excavated in the year 2003 by K.Rajan of Tamil University and based on the promising results; the excavation was resumed in 2021. The trenches laid in the Locality-4 in the present excavation yielded two important AMS dates. The two dates were obtained at the depth of 104 cm and 130 cm which yielded the mid-range calibrated dates for the said two dates are 1615 BCE and 2172 BCE respectively. These two dates provided a new understanding of the nature of cultural deposits. Three important features could be understood based on these dates.

- First, iron has appeared in Tamil Nadu as early as 2200 BCE.
- Second, the late Neolithic phase was identified before the 2200 BCE as there is a cultural deposit of 25 cm below the dated level.
- Third, the black-red-red ware was introduced in the late Neolithic phase itself in contrast to the wider belief that the black-and-red ware was introduced in Iron Age.

Thus, the present two AMS dates obtained from Mayiladumparai further substantiated and strengthened the view on the existence of the Iron Age in the 2200 BCE and the Neolithic phase prior to this date in Tamil Nadu.

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MAYILADUMPARAI Excavation

Under the guidance of

Thiru T. Udhayachandran, IAS
Principal Secretary to Government

Dr. Chandara Mohan,B, IAS
Principal Secretary to Government
Tourism, Culture and Religious Endowment

Dr. R. Sivanantham
Commissioner [FAC].,
Department of Archaeology

Prof. K. Rajan
Academic and Research Advisor
Tamil Nadu Department of Archaeology

Excavation Team

MAYILADUMPARAI

Excavation Director: Thiru. **K. Sakthivel** Archaeological Officer

Archaeologist: Thiru. **S. Paranthaman** Archaeological Officer

Thiru. **R. Venkata Guru Prasanna,** Archaeological Officer

Neolithic Exploration Team

Head: Prof. **K. Rajan**
Collaborators: Prof. **Shanthi Pappu**
Dr. **Kumar Akhilesh**

Director: Dr. **R.Sivanantham**
Co Director: Tmt. **K. Bakialakshmi**

Surveyor: Thiru **K. Olimalik,** Asst. Executive Engineer

Chemist: Thiru **P. Senthilkumar**

Technical Supporting : Tmt **K. Bakialakshmi,** Archaeological Officer

Thiru. **D. Prakash,** Superintendent

Administrative Supporting : Thiru V. Sivanandam, Assistant Director (H.Q)

Tmt **N. Nagarathinam,** Superintendent

Tmt. **B. Mythili,** Superintendent

Thiru **G. Saravanan,** Assistant

Thiru **A. Rajan,** Assistant

Thiru **B. Lakshmikandan,** Junior Assistant

Thiru **S. Anbunambi,** Cashier